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ABSTRACT

A unified conceptual model is needed to integrate the extensive research on (1) social competence and adaptive behavior, (2) converging conceptualizations of social adjustment and psychopathology, and (3) emerging concepts and measures of academic competence. To develop such a model, a study was conducted in which teacher ratings were collected on two cohorts of kindergarten children (numbering 110 and 119, respectively). Several measures were used, including the Classroom Behavior Inventory, Bipolar Trait Ratings, Conners' Teacher Rating Scales, and global ratings of social adjustment and academic competence. Factor analysis and multidimensional scaling were used to isolate major dimensions and regions of configurational organizations of measures. These analyses identified three dimensions and conceptual regions related to major diagnostic syndromes: extraversion versus introversion, considerateness versus hostility, and academic competence. Adaptive and maladaptive behavior scales, psychopathology scales, bipolar trait-rating scales, and academic competence scales were integrated by a spherical model of adaptive behavior. In general, the model integrated major dimensions of social adjustment and academic competence with major syndromes of psychopathology. The model also integrated diagnostic categories of mental retardation and learning disabilities with conduct problems and personality problems associated with patterns of social and emotional behavior. (Author/RH)

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Unified Model for Academic Competence, Social Adjustment, and Psychopathology

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Abstract

A unified conceptual model is needed to integrate the extensive research on social competence and adaptive behavior, converging conceptualizations of social adjustment and psychopathology, and emerging concepts and measures of academic competence. Teacher ratings were collected on two cohorts of kindergarten children (N = 110; N = 119) with the Classroom Behavior Inventory, Bipolar Trait Ratings, Conners' Teacher Rating Scales, and Global Ratings of social adjustment and academic competence. Factor analysis and multidimensional scaling were used to isolate major dimensions and regions of configurational organizations of measures. The analyses identified three dimensions as well as conceptual regions of extraversion versus introversion, considerateness versus hostility and academic competence which are related to major diagnostic syndromes. Adaptive and maladaptive behavior scales, psychopathology scales, bipolar trait rating scales and academic competence scales are integrated by a spherical model for adaptive behavior that includes but transcends a circumplex model for social and emotional behavior. The unified model differentiates and integrates concepts for cognition or intelligence, conation or motivation, and affect or social and emotional behavior.

Unified Model for Academic Competence, Social Adjustment, and Psychopathology

The need for a differentiated but unified conceptual model for the domain of child behavior can be demonstrated by the history of research on social competence. White's (1959) paper on the concept of competence stimulated subsequent discussion but little consensus on conceptualization and measurement (Kent & Rolf, 1979; Zigler & Trickett, 1978). A panel of experts identified 29 facets of social competence in young children that might be goals of early intervention but did not suggest methods for measuring or for integrating those concepts (Anderson & Messick, 1974). A review of research on competence in children (Garmezy, Masten, Nordstrom, & Ferrarese, 1979) that identified more than 30 relevant terms, including coping behavior, adaptability, personality, emotional adjustment, and maladjustment, found that the literature on competence has increased rapidly during the last 30 years. The numerous concepts, measures, and studies of child social competence motivates the search for a unified conceptual model.

Intensive development of concepts and measures, availability of statistical methods for integrating empirical measures, and existing integrations of specific fields provide a research basis for a unified conceptual model for the domain of child behavior in the classroom. The initial integration of a limited set of data

(Schaefer & Edgerton, 1982) motivated further development of a unified model for academic competence, social adjustment and psychopathology. Evidence of the equivalence of concepts of social adjustment, adaptive behavior and psychopathology would support a focus on a positive goal of development of social competence and adaptive behavior as a method for preventing or remediating deviant behavior (Baer, Rowbury, Baer, Herbert, Clark & Nelson, 1976; Schroeder, 1979).

Clinical studies of children that have organized specific symptoms and deviant behaviors into broader syndromes or dimensions have resulted in identification and replication of major patterns of psychopathology (Achenbach, 1966; Ackerson, 1942; Hewitt & Jenkins, 1946; Peterson, 1961; Rutter, 1967). Reviews of the literature by Achenbach and Edelbrock (1978) and Quay (1979) have noted the similarity across studies of two major syndromes each with varying labels: (a) conduct problems, unsocialized aggression, antisocial behavior, aggression, externalization, and undercontrol of behavior and (b) personality problems, withdrawal, neurotic behavior, and overcontrol of behavior. Achenbach and Edelbrock's (1978) review found the same broad band syndromes in reports by both parents and teachers.

Major dimensions of child social and emotional behavior provide a framework for development of circumplex models for child social and emotional behavior (Baumrind & Black, 1967; Becker & Krug, 1964; Schaefer, 1961). The circumplex analyses and also two-dimensional factor analyses of classroom behavior (Digman, 1963; Kohn & Rosman, 1972; Peterson, 1961) have identified two

major dimensions of child behavior with varying labels: (a) extraversion, interest-participation, and active behavior; versus introversion, apathy-withdrawal, and passive behavior, and (b) adjustment, love, good socialization, emotional stability, and responsible behavior; versus maladjustment, hostility, poor socialization, emotional instability, and irresponsible behavior. Schaefer (1975) showed that both psychopathology and adaptive social and emotional behavior could be integrated by a two-dimensional circumplex model for child behavior. Kohn and Rosman (1972) integrated adaptive behavior scales and maladaptive behavior scales in bipolar dimensions. Kohn (1977) has shown equivalence of Peterson's conduct problems and personality problem scales to Schaefer and Aaronson's (1967) considerateness/hostility and extraversion/introversion scales.

Although most studies of the personality domain have been limited to social and emotional behavior, some of the studies of psychopathology reviewed by Achenbach and Edelbrock (1978) have also identified syndromes of learning problems, academic disability, and hyperactive behavior. Similarly studies of teacher ratings of child behavior have identified the positive pole of this dimension as autonomous achievement striving (Beller, 1959), industrious behavior (Digman, 1972), and need achievement versus task avoidance (Miller, 1972). Schaefer (1971) labeled this dimension as task-orientation versus distractibility including scales of perseverence, conscientiousness, attentiveness, methodicalness, and achievement-orientation versus hyperactivity, distractibility, inappropriate talkativeness, and

work fluctuation. Schaefer and Edgerton (1978) have also developed teacher rating scales of verbal intelligence, curiosity/creativity and independence that are related to but also differentiated from task-orientation. Thus several studies have identified patterns of academic competence and motivation that complement scales of social and emotional behavior in studies of child adaptive behavior in the classroom.

The major method for the identification of dimensions of child behavior has been factor analysis. Guttman's (1954) discussion of an "order of neighboring" among variables motivated the use of factor loadings to plot circumplex organizations of interrelationships of teacher ratings (Baumrind & Black, 1967; Becker & Krug, 1964; Schaefer, 1961). Guttman's work also contributed to the analysis of proximities of concepts (Shepard, Romney & Nerlove, 1972) and to multidimensional scaling methods of plotting conceptual configurations of the interrelationships of measures. The utility of multidimensional scaling methods in experimental and social psychology (Borg, 1981; Shepard, 1980; Shepard et al., 1972) suggests that the method would also be useful for mapping the interrelationships of child behavior measures. Factor analyses would reveal the major dimensions of the conceptual space while multidimensional scaling would generate conceptual configurations that provide a visual presentation of the interrelationships of concepts.

The definition of the domain and the selection of specific concepts and items for use in a study determine the dimensions or syndromes that can be identified. Usually, with limited sampling

of concepts, models include only adaptive behavior, only maladaptive behavior, or only dimensions of academic competence. However if a study combined adaptive and maladaptive behavior ratings and included the domain of academic competence, a more comprehensive model for child behavior could be generated.

Method

Subjects and Procedure

Teachers from 37 inner-city, suburban, and rural schools provided ratings of 110 children--84 black and 26 white--from low-income families during April of the kindergarten year. The rating forms were mailed to the teachers with a copy of a consent form from the mother. A 100 percent rate of return was obtained. Each set of rating forms included the inventories in random order to prevent order effects in completion of the methods. In a second age cohort, teacher ratings were collected on 119 children with similar characteristics.

Data Collection Methods

The rating methods included unipolar positive and negative scales, bipolar scales, psychopathology scales, and global ratings. The Classroom Behavior Inventory (CBI) consisted of 3- to 5-item scales for extraversion, introversion, considerateness, hostility, task-orientation, distractibility, curiosity/creativity, verbal intelligence, and independence (Schaefer & Edgerton, 1978). The Bipolar Trait Ratings (BTR), a revision and extension of bipolar ratings reported by Becker and Krug (1964), included 4-item scales for extraversion versus introversion, cooperativeness versus hostility, creativity versus

apathy, task-orientation versus distractibility, high intelligence versus low intelligence, and positive affect versus negative affect. A version of Conners' (1969) Teacher Rating Scales (CTRS) as revised from Goyette, Conners, and Ulrich (1978) included 6-item scales for conduct problems, depression, apathy/passivity, and hyperactivity. Teachers also completed single-item Global Ratings (GR) for academic competence and for social adjustment.

Statistical Analyses

Internal consistency reliabilities were computed with Cronbach's alpha for each of the scales of the Classroom Behavior Inventory, Bipolar Trait Ratings, and Conners' Teacher Rating Scales. A separate factor analysis of scales of the CBI replicated earlier findings that much of the common factor variance is included in three major factors (Schaefer & Edgerton, 1982). Principal factor analysis with orthogonal rotation was also completed for combined ratings on the CBI, BTR, CTRS, and GR. Spatial plots revealed regions of related measures that were rotated to similar positions for related concepts in two multidimensional scaling analyses.

Results

The internal consistency reliabilities for the 3- to 5-item scales of the CBI ranged from .73 to .94, for the first cohort. Internal consistency reliabilities of the BTR and Conners' scales, that were improved by regrouping items on the basis of the factor analysis, varied from .82 to .92.

The factor analysis of the unipolar positive and unipolar negative scales of the CBI that is reported in Table 1 reveals

Insert Table 1 About Here

factors of Considerateness versus Hostility, Academic Competence, and Extraversion versus Introversion. High loadings of verbal intelligence and substantial but lower loadings of independence, curiosity/creativity, task-orientation, and distractibility define a factor of Academic Competence. In addition, curiosity/creativity has loadings on Extraversion versus Introversion, while task-orientation and distractibility have loadings on Considerateness versus Hostility.

The factor structures of the combined scales of the CBI, BTR, CTRS, and GR for both the first and second cohorts are reported in Table 2. Conners' psychopathology scales, the Bipolar Trait

Insert Table 2 About Here

Ratings scales, and the positive and negative scales of the CBI are integrated by the three dimensions of Considerateness versus Hostility, Academic Competence and Extraversion versus Introversion for both cohorts. The CBI considerateness and hostility scales, the BTR cooperativeness versus hostility scale, and the Conners' conduct problem scale have similar loadings on a common factor. The order of neighboring (Guttman, 1954), organized from similarities of factor loadings for adjacent scales, reveals similarity in content and meaning of different measures from different methods.

Conceptual configurations or maps of the interrelationships of concepts for two dimensions can be determined by plotting factor loadings and for three dimensions by plotting orthographic projections of factor loadings for the three-dimensional space. However, multidimensional scaling (MDS) analysis provides a more

direct method of developing a conceptual configuration. The map generated by ALSCAL for the scales of the CBI is shown in

Insert Figure 1 About Here

Figure 1. The order of neighboring from a region of extraversion and low introversion, to curiosity/creativity, to verbal intelligence, to task-orientation and low distractibility, to considerateness and low hostility is almost identical to the order of neighboring that was organized from similarities in factor loadings of CBI scales in Table 1. Thus factor analysis and multidimensional scaling are complementary methods for generating the same order of neighboring.

The hypothesis that multidimensional scaling can generate a unified conceptual configuration from different concepts and from different methods is confirmed by the ALSCAL analysis of the combined measures from the CBI, BTR, CTRS, and GR for the first cohort that is plotted in Figure 2. The MDS analysis supports the order of neighboring developed from similarities of factor loadings in Table 2. Three major regions are revealed that

Insert Figure 2 About Here

integrate adaptive behavior, maladaptive behavior, and psychopathological concepts. Descriptive concepts for the regions might be drawn from broad band psychopathological concepts reviewed by Achenbach and Edelbrock (1978) and by Quay (1979) or from the dimensions that have been developed in two dimensional and circumplex analyses of social and emotional behavior (Schaefer, 1982; Wiggins, 1982). The map generated by MDS reveals concepts that share meaning with two regions and shows variations in meaning of the concepts and measures.

Discussion

The relatively high internal consistency reliabilities for 3- to 6-item scales that are shown in Table 2 suggest that development of short scales is an efficient method for investigating a conceptual domain. Brief reliable scales for specific concepts allow an investigator to utilize several measures and several methods in research on child behavior and to determine the most valid measures of a dimension or conceptual region.

The replicated factor analyses and the MDS analyses of the CBI and the combined methods provide further confirmation of the spherical model for academic competence and social adjustment in Figure 3 (Schaefer & Edgerton, 1982). The outer circle of the model replicates circumplex models for social and emotional

Insert Figure 3 About Here

behavior. The third dimension of academic competence is best described by intelligence but with significant factor loadings for task-orientation, which also shares variance with considerateness, and for curiosity/creativity, which also shares variance with extraversion. The positive octant that is circumscribed by intelligence, considerateness and extraversion is positively correlated with global ratings of academic competence and social adjustment while the polar opposite negative octant that is shown in Figure 4 is described by diagnostic categories of low academic

Insert Figure 4 About Here

competence and psychopathology. Thus the three-dimensional spherical model integrates major dimensions of social adjustment

and academic competence with major syndromes of psychopathology. The model also integrates diagnostic categories of mental retardation and learning disabilities, defined by varying combinations of deficiencies in intelligence and adaptive behavior, with conduct problems and personality problems which are associated with patterns of social and emotional behavior. In the factor analyses and in MDS, hyperactivity is related both to hostility/conduct problems and to low intelligence, thus replicating findings of research on learning disabilities, attention disorders, and hyperkinesis (McKinney & Forman, 1982; Plomin & Foch, 1981). Personality concepts and diagnostic categories can be interpreted as related concepts whose overlapping boundaries are shown by proximities in conceptual models (Wiggins, 1980).

The model shows that cognition/intelligence, conation/motivation, and affect/social and emotional behavior can be integrated within a three dimensional spherical model. The relationship of both task-orientation and curiosity/creativity with intelligence might be interpreted by Feather's (1972) hypothesis that success contributes to persistence, while persistence and motivation also contribute to success. The correlated but differentiated learning styles of curiosity/creativity and of task-orientation are both related to intelligence but are related to different dimensions of social and emotional behavior. Although more attention has been given to task-orientation versus distractibility by researchers, clinicians, and teachers, description of a pattern of

curious/creative behavior may contribute to attempts to develop and reinforce that style of learning.

Although the spherical model for adaptive behavior has been developed from teacher ratings of classroom behavior, numerous replications of the circumplex model for social and emotional behavior (Schaefer, 1982; Wiggins, 1980) suggest the probability that the model can be replicated for other age groups, in other situations, and with other methods that adequately sample the domain. Since the scales and items of the Bipolar Trait Ratings are applicable in many different situations, those measures might be used with other measures in further testing and elaboration of the model.

The successful use of factor analysis and multidimensional scaling to generate conceptual configurations suggests that additional comprehensive measures of adaptive behavior might be organized with those methods. Research on parsimonious conceptualization of social adjustment and academic competence has typically used factor analysis to isolate independent dimensions. The use of major dimensions to plot conceptual configurations would provide new perspectives on relationships among concepts. The analysis of proximities and mapping of relationships among measures of existing data sets through multidimensional scaling would also complement the many factor analytic studies of child social and emotional behavior and psychopathology.

Guttman's (1954) concept of an order of neighboring is illustrated by the sequential ordering from extraversion, to curiosity/creativity, to intelligence, to task-orientation, to considerateness for the CBI. The overlapping, correlated concepts

suggest that antecedents and correlates of one concept may also be related to neighboring concepts. Although the model gives a phenotypical description of child behavior, use of the model for integrating research findings within or across studies may contribute to more rapid progress in determining antecedents and correlates of the major dimensions and regions of the model.

Warr's (1980, p. 291) discussion of conceptual models describes both the strengths and possible limits of this model.

> "Our conceptual moulds give shape to our thinking, establish systems of meaning, and create familiar patterns which we can manipulate and work with... The economy, guidelines, and objectives provided by these scientific perspectives are of clear benefit to an investigator, yet their negative aspects, limited focus and restricted notions of what is worthwhile, need always to be kept in mind."

The initial goal of integrating social adjustment concepts, psychopathological concepts, and academic competence concepts has been achieved. Further integration of other measures with the concepts and measures of this study promises to yield more comprehensive models and to integrate the extensive research on child adjustment, competence, and psychopathology.

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Table 1

Factor Structure of Classroom Behavior Inventory

C1 (N = 110 Kindergarten Children)
C2 (N = 119 Kindergarten Children)

Scales:	Factor Loadings I[1]		II		III	
	C1[2]	C2	C1	C2	C1	C2
Considerateness	93[3]	83	20	32	04	02
Hostility	-77	-93	-10	-11	03	09
Task-Orientation	46	38	74	77	10	12
Distractibility	-43	-48	-68	-71	-09	-04
Independence	24	19	77	83	14	25
Verbal Intelligence	-04	-02	84	84	30	26
Creativity/Curiosity	-01	-04	76	60	49	55
Introversion	02	-02	-30	-16	-80	-67
Extraversion	06	-01	13	07	89	99

1. Factors: I. Considerateness vs. Hostility
   II. Academic Competence
   III. Extraversion vs. Introversion

2. C1 = Cohort 1; C2 = Cohort 2

3. Decimal points omitted

Table 2

Factor Structure and Internal Consistency Reliabilities of Scales of Competence, Adjustment, and Psychopathology from Four Methods

Scales	Method[1,2]		No. of Items	Reliabilities[3] C1	Factor Loadings I[4] C1[5]	I C2	II C1	II C2	III C1	III C2
Considerateness	CBI	U+	5	87[6]	87	85	15	24	06	02
Cooperativeness	BTR	U	4	89	80	83	15	15	14	18
Hostility	CBI	U-	3	88	-83	-92	-03	-04	00	09
Conduct Problems	CTRS	U-	4	82	-76	-83	-16	-03	03	-17
Hyperactivity	CTRS	U-	5	92	-78	-76	-27	-39	25	22
Adjustment	GR	B	1		59	56	40	43	38	45
Task-Orientation	CBI	U+	5	93	53	44	67	72	12	07
Task-Orientation	BTR	B	4	83	53	38	66	79	10	11
Distractibility	CBI	U-	3	82	-51	-54	-69	-70	-07	03
Independence	CBI	U+	5	86	30	25	70	74	12	18
Apathy/Passivity	CTRS	U-	5	84	-20	-17	-67	-71	-26	-34
Competence	GR	B	1		19	16	80	81	08	10
General Intelligence	BTR	B	4	91	17	04	82	91	29	08
Verbal Intelligence	CBI	U+	5	94	01	01	85	89	24	18
Curiosity/Creativity	CBI	U+	5	91	04	01	75	64	47	51
Curiosity/Creativity	BTR	B	4	85	02	03	72	72	52	45
Depression	CTRS	U-	5	82	-26	-17	-19	-11	-66	-78
Introversion	CBI	U-	3	73	02	-01	-34	-21	-81	77
Extraversion	BTR	B	5	85	-15	-07	20	14	87	84
Extraversion	CBI	U+	5	87	-01	01	17	15	90	89

[1] BTR=Bipolar Trait Ratings
CBI=Classroom Behavior Inventory
CTRS=Conners Teacher Rating Scales

[2] U+=Unipolar Adaptive
U-=Unipolar Maladaptive
B=Bipolar

[3] Cronbach's Alpha

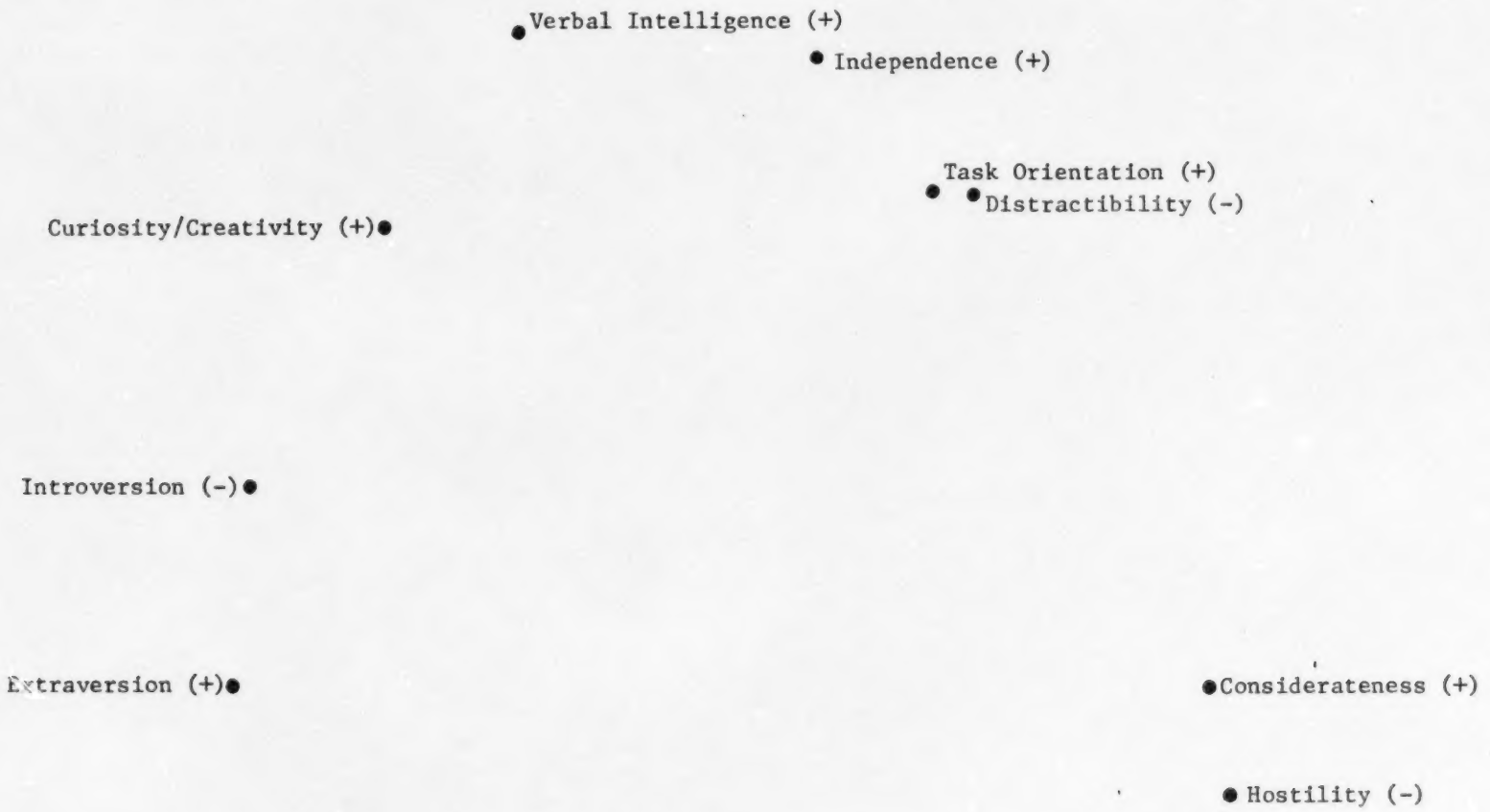
[4] I.=Considerateness vs. Hostility
II.=Academic Competence
III.=Extraversion vs. Introversion

[5] C1=Cohort 1, N=110
C2=Cohort 2, N=119

[6] Decimal Points Omitted

Figure 1

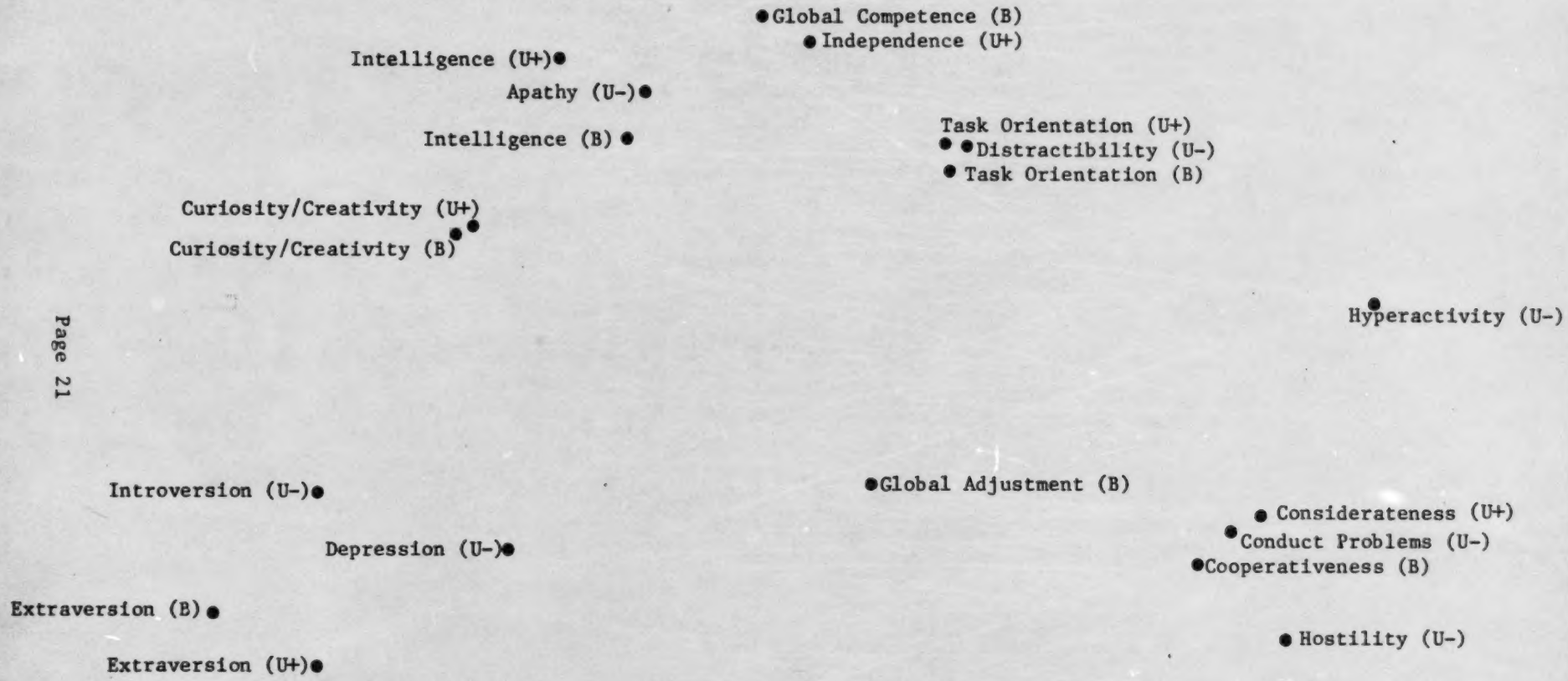
Multidimensional Scaling Plot of Classroom Behavior Inventory



(-) indicates reversed scale

Figure 2

Multidimensional Scaling Plot of Classroom Behavior Inventory, Bipolar Trait Ratings, Conners' Teacher Ratings and Global Ratings



U+ = Unipolar Adaptive
U- = Unipolar Maladaptive/Pathological
B = Bipolar

Figure 3

A Two-Dimensional Projection of a Spherical Model for Adaptive Behavior

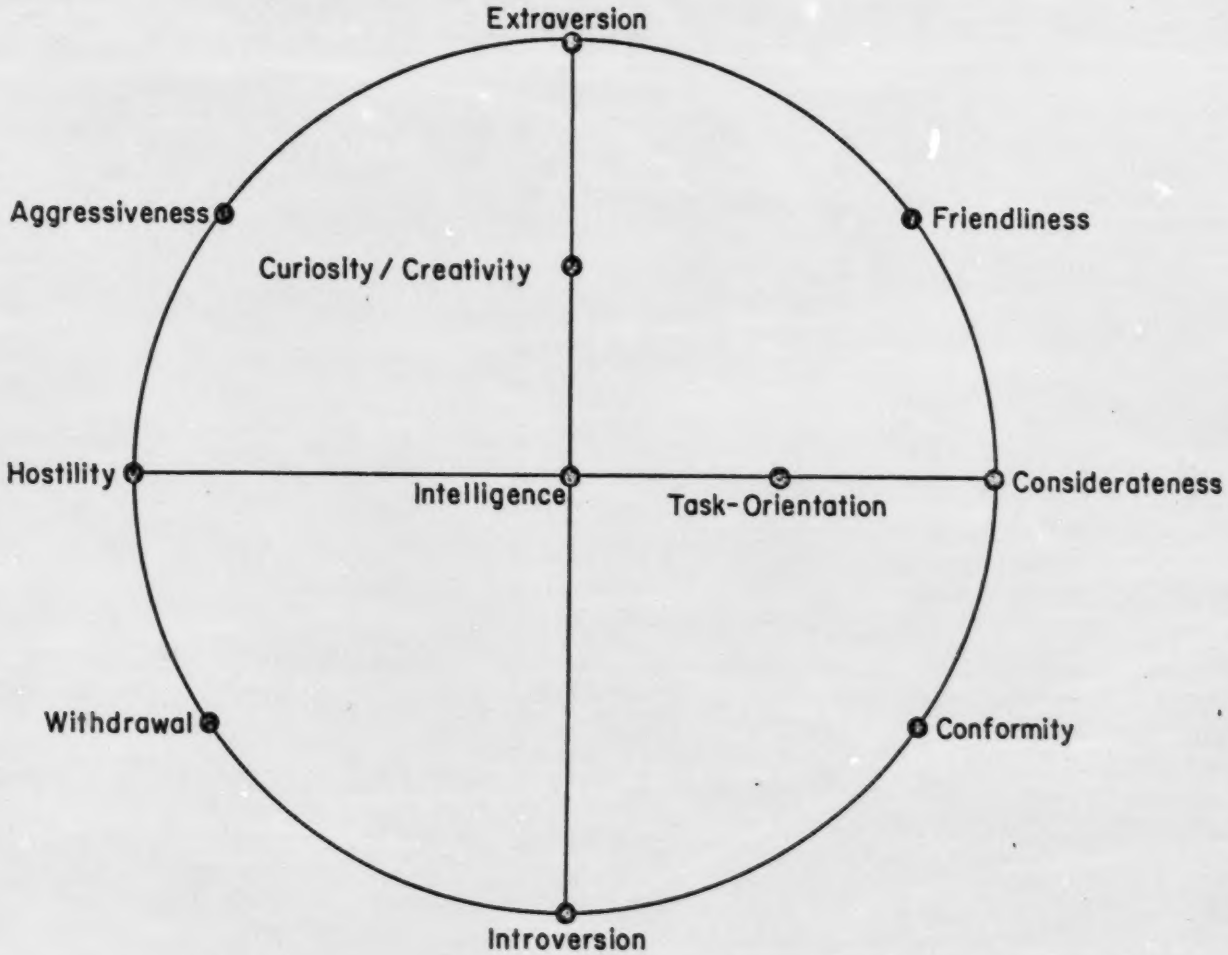


Figure 4

A Configurational Model for Maladaptive Behavior and Diagnostic Constructs